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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte DONG-HOON LEE and JONG-SUNG KIM

Appeal 2008-2245
Application 09/901,079[1]
Technology Center 2800

Decided:[2] February 6, 2009

Before KENNETH W. HAIRSTON, JOSEPH F. RUGGIERO, and SCOTT R. BOALICK, *Administrative Patent Judges*.

BOALICK, *Administrative Patent Judge*.

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[1] Application filed July 10, 2001. Application 09/901,079 claims the benefit under 35 U.S.C. § 119 of Korean application 2000-39404, filed July 10, 2000. The real party in interest is LG.Philips LCD Co., Ltd.

[2] The two-month time period for filing an appeal or commencing a civil action, as recited in 37 CFR § 1.304, begins to run from the decided date shown on this page of the decision. The time period does not run from the Mail Date (paper delivery) or Notification Date (electronic delivery).

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134(a) from the rejection of claims 1-10, 15-24, and 29-36, all the claims pending in the application. We have jurisdiction under 35 U.S.C. § 6(b).

We reverse.

STATEMENT OF THE CASE

Appellants' invention relates to an in-plane switching (IPS) liquid crystal display device. (Spec. 2:6-8.)

Claims 1 and 30 are exemplary:

1. An in-plane switching liquid crystal display device comprising:

first and second substrates;

a gate line arranged in one direction on the first substrate;

a common line arranged on the first substrate;

a gate insulation layer on the first substrate;

a data line on the gate insulation layer;

a first passivation layer on the gate insulation layer;

a plurality of common electrodes in contact with the first passivation layer;

a second passivation layer on the first passivation layer, wherein the second passivation layer is an inorganic material;

a plurality of pixel electrodes on the second passivation layer, wherein the plurality of common electrodes and plurality

of pixel electrodes are parallel to and spaced apart from each other; and

a liquid crystal layer between the first and second substrates,

wherein the gate insulation layer and the first passivation layer include a plurality of common line contact holes,

wherein the first passivation layer and the second passivation layer include a drain contact hole exposing a drain electrode,

wherein one of the plurality of pixel electrodes is electrically connected to the drain electrode through the drain contact hole, and

wherein each common electrode is electrically connected with the common line through a corresponding common line contact hole.

30. An in-plane switching liquid crystal display device, comprising:

first and second substrates;

gate lines on the first substrate;

data lines perpendicular to the gate lines to form a plurality of pixel regions;

a thin film transistor in each of the pixel regions at a crossing point of the data lines and the gate lines;

a common line on the first substrate in each of the pixel regions, the common line parallel to the gate lines;

a first insulation layer over the gate lines, the data lines being on the first insulation layer;

a second insulation layer over the data lines and the common line;

a plurality of first contact holes through the first and second insulation layers over the common line;

a plurality of common electrodes in contact with the second insulation layer, wherein the common electrodes contact the common line via the first contact holes;

a third insulation layer on the common electrodes and the second insulation layer, wherein the third insulation layer is an inorganic material;

a second contact hole through the second and third insulation layers over a drain electrode of the thin film transistor;

a plurality of pixel electrodes on the third insulation layer, wherein one of the plurality of pixel electrodes is electrically connected to the drain electrode through the second contact hole; and

a liquid crystal interposed between the first and second substrates.

The prior art relied upon by the Examiner in rejecting the claims on appeal is:

Sakamoto	US 6,507,382 B1	Jan. 14, 2003 (filed Mar. 30, 2000)
Kim	US 5,581,382	Dec. 3, 1996
Shin	US 6,356,328 B1	Mar. 12, 2002 (filed Nov. 24, 1998)

Chang	US 6,163,355	Dec. 19, 2000 (filed Dec. 14, 1998)
Akiyama	US 6,414,729 B1	Jul. 2, 2002 (filed Mar. 22, 1999)
Wakagi	US 6,300,995 B1	Oct. 9, 2001 (filed Sep. 24, 1999)

Applicant's Admitted Prior Art ("APA" or "ARA"); Specification pp. 2-7 and Figures 1-7D.

Claims 1, 7-10, 15, 16, 24, and 29 stand rejected under 35 U.S.C. § 103(a) as being obvious over APA, Sakamoto, and Kim.

Claims 2, 3, and 17-20 stand rejected under 35 U.S.C. § 103(a) as being obvious over APA, Sakamoto, Kim, and Shin.

Claims 4 and 23 stand rejected under 35 U.S.C. § 103(a) as being obvious over APA, Sakamoto, Kim, and Chang.

Claims 5, 6, 21, and 22 stand rejected under 35 U.S.C. § 103(a) as being obvious over APA, Sakamoto, Kim, and Akiyama.

Claims 30 and 31 stand rejected under 35 U.S.C. § 103(a) as being obvious over APA, Sakamoto, Kim, and Wakagi.

Claims 32 and 33 stand rejected under 35 U.S.C. § 103(a) as being obvious over APA, Sakamoto, Kim, Wakagi, and Shin.

Claim 34 stands rejected under 35 U.S.C. § 103(a) as being obvious over APA, Sakamoto, Kim, Wakagi, and Chang.

Claims 35 and 36 stand rejected under 35 U.S.C. § 103(a) as being obvious over APA, Sakamoto, Kim, Wakagi, and Akiyama.

Rather than repeat the arguments of Appellants or the Examiner, we make reference to the Briefs and the Answer for their respective details.

Only those arguments actually made by Appellants have been considered in this decision. Arguments that Appellants did not make in the Briefs have not been considered and are deemed to be waived. *See* 37 C.F.R. § 41.37(c)(1)(vii).

ISSUE

Have Appellants shown that the Examiner erred in rejecting the claims under 35 U.S.C. § 103(a)?

FINDINGS OF FACT

The record supports the following findings of fact (FF) by a preponderance of the evidence.

APA

1. APA describes a typical in-plane switching liquid crystal device. (Spec. 3:8-9.) Referring to Figures 6 and 7A, APA teaches that a first metal layer is deposited on a substrate 1 and patterned to form the common line 54 and the common electrodes 54a, which communicate with the common line 54. (Spec. 5:6-8, 19-21.) A gate insulation layer 70 is deposited on substrate 1 to cover the first metal layer. (Spec. 6:1-2; Fig. 7B.) Pixel electrodes 66a are formed on the gate insulation layer 70 and then a passivation layer 74 is formed over the gate insulating layer 70 and pixel electrodes 66a. (Spec. 6:14-15, 17-18; Figs. 7C, 7D.)

Sakamoto

2. Sakamoto describes "a liquid-crystal display where both pixel electrode 14 and common electrode 3 for controlling a liquid-crystal layer 40 are disposed above a color filter 10 covered with a shield electrode 20." (Abstract.) Sakamoto teaches that charging of the color filter 10 can cause uneven coloring in the display. (Col. 3, l. 61 to col. 4, l. 2.) "[A]ccording to this invention, a shield electrode is formed covering a color filter or a common electrode covers the color filter." (Col. 4, ll. 59-61.) "[T]he term 'cover' means that the color filter is substantially completely or partially covered." (Col. 4, ll. 61-63.) The shield electrode 20 or the common electrode may be made of a transparent conductive material such as ITO. (Col. 5, ll. 44-47.) Sakamoto describes three specific embodiments (col. 5, l. 63 to col. 11, ll. 16), although the third embodiment is very similar to the second embodiment (col. 10, ll. 8-10).

3. The first embodiment is shown in Figures 1(a) and 1(b). (Col. 5, l. 63 to col. 8, l. 22.) A gate insulating layer 4 is formed on substrate 1 and a protective film 8 is formed on the gate insulating layer 4. Color filter 10 is formed on the protective film 8 and covered with overcoat layer 12. A shield electrode 20 is positioned between overcoat layer 12 and interlayer film 13 so as to substantially cover the color filter 10. A contact hole is formed in the interlayer film 13 and a common electrode 3 is connected to the shield electrode 20. Shield electrode 20 is shown as a large unitary electrode in Figures 1(a) and 1(b).

4. The second embodiment is shown in Figures 3(a) and 3(b). (Col. 8, l. 23 to col. 10, l. 7.) A gate insulating layer 4 is formed on substrate 1 and a protective film 8 is formed on the gate insulating layer 4. Color filter 10 is formed on the protective film 8 and covered with overcoat layer 12. Rather than using a shield electrode 20 as in the first embodiment, the common electrode 3 is positioned between overcoat layer 12 and interlayer film 13 so as to substantially cover the color filter 10. The common electrode 3 is shown as a large unitary electrode in Figures 3(a) and 3(b).

Wakagi

5. Wakagi describes an in-plane switching liquid crystal display device. (Col. 1, ll. 15-20.) Wakagi teaches that "the usual metal electrode has a problem in that it is corroded by the liquid crystal composition, so that it is necessary to form a protective insulating film on top of the electrodes." (Col. 1, l. 66 to col. 2, ll. 2.) "Naturally, in this case, the electrical voltage loss which occurs due to the protective insulation film increases even more." (Col. 2, ll. 2-4.) The invention of Wakagi "reduce[s] losses in the driving voltage applied to the liquid crystal, by providing an active matrix substrate in which degradation of the metal electrode is prevented in a liquid crystal display device." (Col. 2, ll. 7-10.) Wakagi teaches that electrodes made with a conductive oxide film such as ITO are desirable because they are chemically stable and "so even if the liquid crystal is touched a good electrical characteristic may be maintained." (Col. 3, l. 65 to col. 4, l. 2.) The electrodes 12 shown in various embodiments such as those

of Figures 1, 2, 5-10 and 15-17 do not have any protective coating. By contrast, the prior art electrodes 12 shown in Figures 3 and 4 are covered by gate insulator film 4 and protective insulator film 9.

PRINCIPLES OF LAW

All timely filed evidence and properly presented arguments are considered by the Board in resolving an obviousness issue on appeal. *See In re Piasecki*, 745 F.2d 1468, 1472 (Fed. Cir. 1984).

"Section 103 forbids issuance of a patent when 'the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.'" *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1734 (2007). "[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006).

ANALYSIS

On the record before us, we agree with Appellants (App. Br. 7-9; Reply Br. 5-6) that APA, Sakamoto, and Kim do not teach or suggest common electrodes electrically connected with the common line through a corresponding common line contact hole that extends through the gate insulation layer and the first passivation layer, as recited by independent claim 1.

The Examiner found that, although APA does not teach this limitation (Ans. 4-5), the teachings of Sakamoto are "evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to move the plurality of common electrodes [54a] of APA to be on and in contact with the first passivation layer [74] with contact holes in Applicant's first passivation layer [74], second passivation layer, and any insulating protection film [70], as needed to connect a plurality of common electrodes to the common line [54] of APA." (Ans. 5.) We do not agree.

APA teaches that the common line 54 and common electrodes 54a are formed together in the same metal layer which is deposited on the substrate 1. (FF 1.) Sakamoto teaches a liquid crystal display configuration that prevents color unevenness due to charging of a color filter by forming a common electrode 3, or a shield electrode 20 and a common electrode 3, so as to substantially cover the color filter. (FF 2.) Embodiment 2 of Sakamoto teaches the common electrode 3 made of a transparent conductor (FF 2) and positioned between overcoat layer 12 (first passivation layer) and interlayer film 13 (second passivation layer) so as to substantially cover the color filter 10 (FF 4). However, embodiment 2 teaches a large unitary common electrode 3, and there is no teaching or suggestion of a separate common line in either the same layer or in a different layer. (FF 4.)

The Examiner correctly noted (Ans. 23) that embodiment 1 of Sakamoto teaches the use of a contact hole to electrically connect a common electrode 3 to shield electrode 20. Thus, it appears that the shield electrode 20 is being read on the common line. But embodiment 1 of Sakamoto only teaches a contact hole through the first passivation layer. (FF 3.) It does not teach or suggest a contact hole through the gate insulation layer 4, as

required by claim 1. In addition, the shield electrode is made of a transparent conductor and is positioned above the color filter 10. (FF 2, 3.) If the shield electrode 20 were to be moved beneath the color filter 10 and gate insulation layer 4, it would no longer function for its intended purpose.

The Examiner stated that Sakamoto is being used "to teach the particular stacking of insulation layers between the metal layers used to comprise the electrodes" and "[t]he electrode configuration of APA is not modified by Sakamoto." (Ans. 20. (emphasis in original)) We do not see how the electrode configuration of Sakamoto can be separated from the insulation layer configuration of Sakamoto because Sakamoto relies upon either the common electrode 3 or shield electrode 20 to substantially cover the color filter 10 in order to achieve its purpose of reducing color unevenness. We also do not find any teaching or suggestion in Sakamoto to move the common electrode 54a of APA to a position above the first passivation layer 74 of APA and to further leave the common line 54 in its original position in contact with the substrate 1 and to then connect the common electrode 54a with the common line 54 through contact holes that extend through the first passivation layer 74 and the gate insulation layer 70. If anything, Sakamoto appears to suggest moving both the common electrode 54a and the common line 54 to a position above the color filter, per embodiments 1 and 2.

The Examiner stated for the first time in the Answer that "[m]oving the electrodes closer to the liquid crystal layer and farther away from the underlying scan and data lines improves electrostatic field isolation (gets them farther away from the electrostatic 'noise' of underlying electrical conductors) per Figure 3(b) [of Sakamoto]." (Ans. 20.) However,

Sakamoto does not support such a teaching, nor do we find such a teaching in the other applied references. The Examiner has not provided evidence or other support to show that this teaching would have been understood by one of ordinary skill in the art at the time of the invention.

Kim, which was cited to teach a second passivation layer made of an inorganic material (Ans. 6), does not remedy the above noted deficiencies of APA and Sakamoto.

Therefore, we conclude that Appellants have shown that the Examiner erred in rejecting independent claim 1 as well as claims 2-10 and 15, which depend from claim 1, under 35 U.S.C. § 103(a). Independent claim 16 recites limitations similar to those discussed with respect to independent claim 1, and we find the Examiner erred in rejecting independent claim 16 and claims 17-24 and 29, which depend from claim 16, for the same reasons discussed with respect to claim 1.

On the record before us, we also agree with Appellants (App. Br. 9-10) that the teachings of Wakagi are not properly combinable with APA, Sakamoto, and Kim to teach or suggest a third insulation layer on the common electrodes, as recited by independent claim 30.

Wakagi "reduce[s] losses in the driving voltage applied to the liquid crystal, by providing an active matrix substrate in which degradation of the metal electrode is prevented in a liquid crystal display device." (FF 5.) Wakagi teaches that "the usual metal electrode has a problem in that it is corroded by the liquid crystal composition, so that it is necessary to form a protective insulating film on top of the electrodes." (FF 5.) "Naturally, in this case, the electrical voltage loss which occurs due to the protective insulation film increases even more." (FF 5.) We note that the electrode 12

of Wakagi is not shown or described as being covered by any protective insulating film, in contrast to the electrode of the prior art (FF 5). Thus, Wakagi teaches against covering the electrode with an insulating film. Given the teaching of Wakagi against covering the electrode with an insulating film, we do not see how one of ordinary skill in the art would have been motivated to nevertheless cover the electrode of Wakagi with a third insulation layer, as recited by claim 30.

Therefore, we conclude that Appellants have shown that the Examiner erred in rejecting independent claim 30 as well as claims 31-36, which depend from claim 30, under 35 U.S.C. § 103(a).

CONCLUSION

We conclude that Appellants have shown that the Examiner erred in rejecting claims 1-10, 15-24, and 29-36 under 35 U.S.C. § 103(a).

DECISION

The rejection of claims 1-10, 15-24, and 29-36 for obviousness under 35 U.S.C. § 103(a) is reversed.

REVERSED

ack

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